

## Understanding the Evolution of U.S. Manufacturing

Robert E. Hall

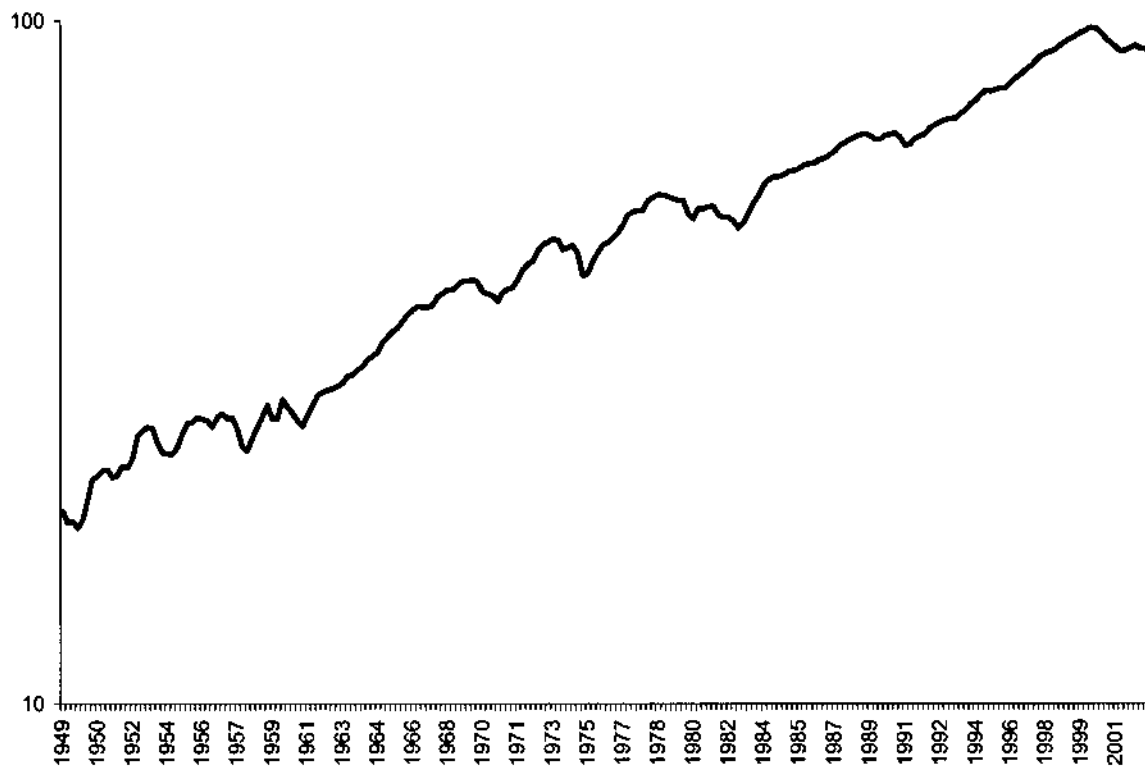
Hoover Institution, Stanford University

### Testimony before the Senate Finance Committee

July 8, 2003

I am grateful for the opportunity to present testimony on the evolution of U.S. manufacturing. My expertise is in the operation of the U.S. economy. I serve as the McNeil Joint Senior Fellow of the Hoover Institution at Stanford and Professor in Stanford's economics department. I also serve as the chairman of the committee of the National Bureau of Economic Research that maintains the generally accepted chronology of the U.S. business cycle.

Figure 1 charts the growth of the volume of goods produced by U.S. manufacturers, on a log scale. Growth has occurred at a constant rate (a straight line on the log scale) with occasional interruptions from recessions. Recent experience is no exception. Growth was slightly above normal through 2000, became negative during the recession that began in early 2001, resumed growth at the end of 2001, and paused in early 2003. The recession of 2001 is deeper than that of 1990, in terms of the production of manufactured goods, but not as deep as a number of earlier recessions.

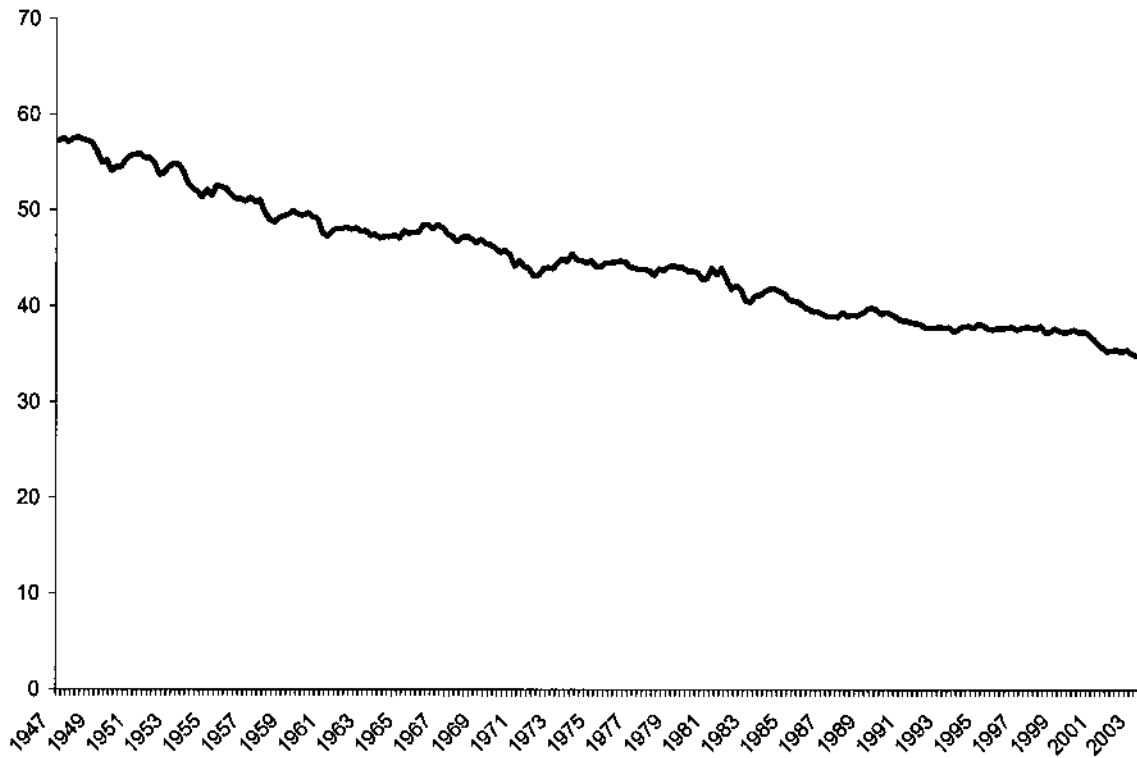


**Figure 1. Index of Output of U.S. Manufacturing, Log Scale**  
 Source: Manufacturing output index, Bureau of Labor Statistics

The important lesson of Figure 1 is that the United States has a manufacturing sector that has grown steadily over the past 50 years, with particularly rapid growth in the years before the current recession. There is no sign in the data on output of the onset of chronic ill health in manufacturing. Rather, the normal growth of manufacturing output has been interrupted recently by a recession of fairly typical magnitude.

Figure 2 looks at the manufacturing sector from a different perspective. It shows the fraction of Gross Domestic Product that the goods produced by the manufacturing sector (or imported from foreign manufacturers) account for. The fraction has declined steadily. The decline reflects a profound alteration that is occurring in the United States and all other advanced economies—produced goods are becoming rapidly cheaper and account for declining fractions of spending, even though the volume of goods is expanding

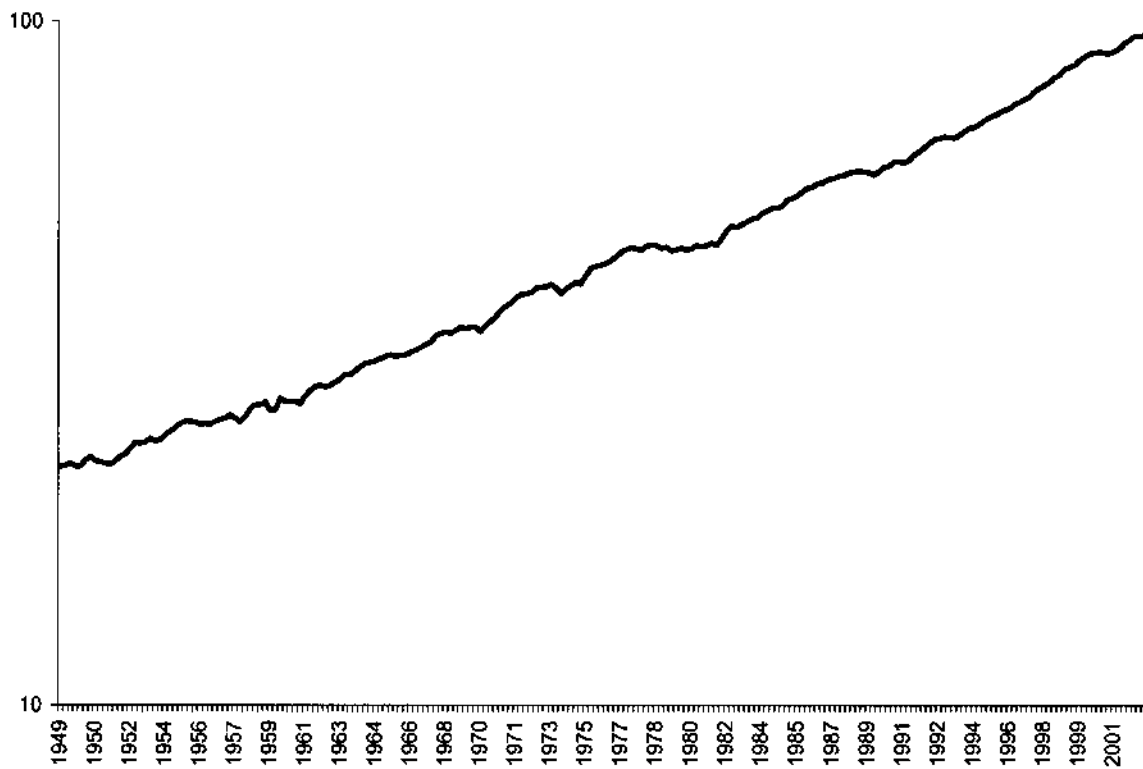
rapidly. Spending is shifting toward the services that are becoming more expensive—health, education, and housing. Rapid productivity growth in the manufacturing sector is the key to this transformation.



**Figure 2. Manufactured Products as a Percent of Gross Domestic Product**

Source: National Income and Product Accounts, Table 1.3. Gross Domestic Product by Major Type of Product

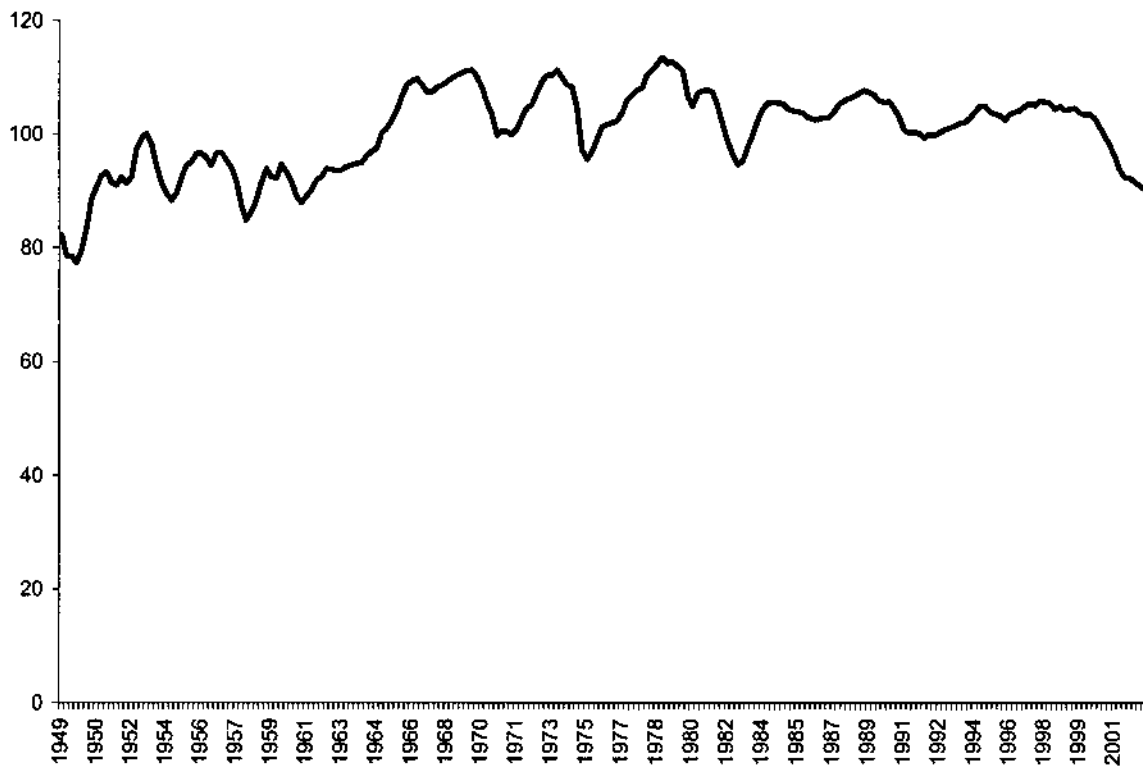
Figure 3 shows the record of productivity growth in U.S. manufacturing since 1949. Except for a pause in the late 1970s and a brief decline in recessions, including the one that began in 2001, growth has been steady and rapid. Manufacturing leads all other sectors in productivity growth.



**Figure 3. Productivity in Manufacturing, Log Scale**

Source: Output per hour in manufacturing, Bureau of Labor Statistics

One of the important implications of rapid productivity growth in manufacturing is that employment in the sector has remained roughly constant over the past 50 years—a constant workforce has produced a rapidly growing volume of goods. Figure 4 shows an index of the total amount of work performed in manufacturing, measured as annual hours of work of all workers. Although the amount of work performed declined in the recent recession, the decline was no greater than in previous recessions.

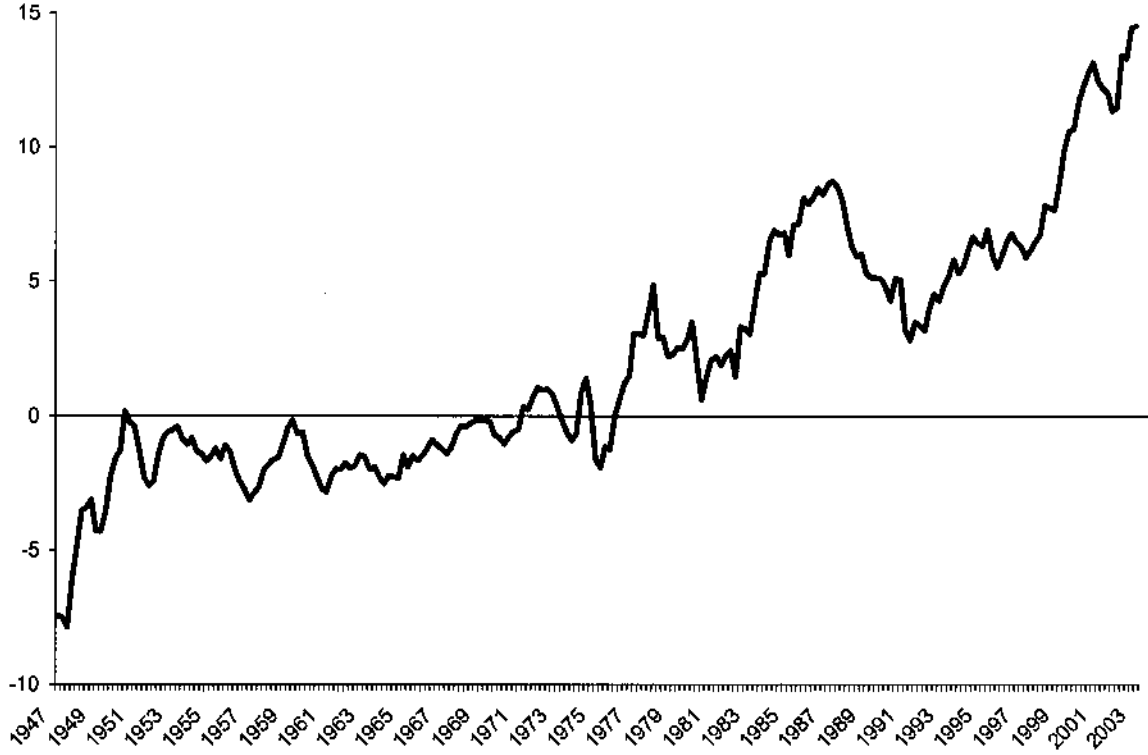


**Figure 4. Labor Used in Manufacturing, Index of Total Hours of Work**

Source: Bureau of Labor Statistics

My final comment about trends in manufacturing deals with U.S. trade in manufactured goods with other nations. Figure 5 shows net imports of manufactured goods (goods imported less goods exported), as a fraction of total goods used in the U.S. economy. Before 1970, the United States was a net supplier of goods to other countries. Since then, the United States has been a net purchaser. The fraction of goods purchased abroad rose particularly dramatically over the past four years. The primary factor underlying the trend toward importing goods is the successful specialization of countries like China in producing standardized, mass-produced consumer goods. The United States, by contrast, specializes in services and intellectual property. Another important factor is that the United States offers by far the most attractive investment prospects of any country in the world and thus attracts huge inflows of capital. The inflow of goods from other

countries reflects the use of those capital inflows to finance purchases of plant and equipment within this country.



**Figure 5. Net Imports of Manufactured Products, as a Percent of U.S. Production**  
Source: National Income and Product Accounts, Table 4.1. Foreign Transactions in the National Income and Product Accounts, net imports of goods as a percentage of the goods component of GDP, Table 1.3

Let me now turn to the current state of manufacturing. The conclusion of my review of the data was that the U.S. manufacturing sector was on its normal trend of rapidly growing output and constant employment, together with the decline that began around the end of 2000 associated with the recession. Figure 6 breaks down manufacturing employment into 8 subsectors and tells more about the nature of this recession. Most consumer-goods industries, such as food and furniture, suffered fairly small employment reductions. The auto industry cut back a fair amount, despite the surprising continuation of

high levels of sales. Capital goods—machinery and computers—saw reductions of about 20 percent in employment, abnormal even for a recession. And apparel employment declined by an astonishing 40 percent (this is the smallest of the sectors, however).



**Figure 6. Employment in Manufacturing Industries, January 1998=100**

Source: Bureau of Labor Statistics, payroll employment data

The figure confirms a standard view about this recession—at its center is a dramatic decline in business capital goods spending, especially for computers. This category of spending reached high levels in the late 1990s and then fell, along with the stock market. In addition, as the employment figures for apparel demonstrate, an acceleration of the process of importing some types of low-tech goods from low-cost countries rather than producing them at higher cost in the United States contributed to employment and output declines.

These shocks, while disturbing to the workers and owners in the affected industries, are not large by historical standards. The changes in employment in armament industries in the demobilizations from World War II and the Korean War dwarf them. Based on past experience, we can say with some confidence what is in store for the next few years, as the economy recovers from the shocks that caused the recession. Capital-goods spending will gradually recover and employment will rise in that sector, but only quite slowly. Workers laid off from industries suffering permanent declines, such as apparel, will be absorbed, but only gradually, in other, growing sectors, many outside manufacturing.

The Federal Reserve has pursued an aggressive policy of low interest rates during the period of slack following the recession. This policy is exactly right for the circumstances. The policy has stimulated one non-manufacturing sector—homebuilding—and permitted that sector to absorb some of the workers who lost jobs in manufacturing. The policy will also stimulate spending on business equipment as the economy recovers.



## Questions for Robert E. Hall

**From Senator Orrin G. Hatch**

**Question:** Professor Hall, I know in the past you've been a supporter of letting businesses immediately deduct the full cost of business equipment. I've been a big believer in moving toward expensing, because I'm convinced that when workers have more equipment to work with, they're more productive. And as we all know by now, productivity growth is the real key to long-lasting wage growth. Can you explain how equipment expensing helps American workers? And do you think that equipment expensing would improve the long-term prospects for U.S. manufacturing?

**Professor Hall's answer:** Expensing investment is the key to a consumption tax. By removing investment from the tax base, the tax falls on consumption, the best measure of a taxpayer's ability to pay. In addition, taxing consumption provides the right incentive for capital formation. Our current income tax biases business away from capital. The harm is greatest in capital-intensive industries, which are typically in the manufacturing sector.

**Question:** Professor Hall, Ms. Lee, and Ms. Kobe, I would like to ask all of you economists this next question. Given that the U.S. must repeal its FSC/ETI export tax incentive, and that we cannot replicate the benefits of that incentive, doesn't it make sense to you as economists that we should replace it with tax provisions designed to increase productivity and capital formation?

**Professor Hall's answer:** I certainly agree. I am in favor of improvements in the tax system that would move it toward a consumption tax, which provides the optimal incentives for productivity improvements and capital formation. These changes should not target any particular sector, but should be available to business in general.

**Question:** Professor Hall and Ms. Kobe, you both mentioned in your testimony the significance of productivity growth to the manufacturing sector. In your view, what are the tax policies this Committee should pursue to help ensure continuing productivity growth?

**Professor Hall's answer:** First, as I stressed in my testimony, American manufacturing has an outstanding record of recent productivity growth. To sustain and improve that record, we should move toward a broad, uniform consumption tax, with expensing of investment at the business level and further reductions in the taxation of dividends and capital gains, to build upon the improvements that Congress has enacted recently.

"Please review these questions expeditiously and provide answers, in writing, to Brad Cannon at the Committee on Finance, 219 Dirksen Senate Office Building, Washington, DC, 20510, by July 22, 2003. Please also send your answers to [brad\\_cannon@finance.rep.senate.gov](mailto:brad_cannon@finance.rep.senate.gov) via email and include each question with the answer."  
Brad Cannon, (202) 224-4515.